

Claims

- [c1] A device for an automotive vehicle comprising:
a seatbelt having a buckled state and an unbuckled state; and
a self-powered wireless switch assembly coupled to the seatbelt, the self-powered wireless switch assembly comprising an energy harvesting element generating electrical power, and a wireless transmitter transmitting a wireless status signal corresponding to the buckled state and the unbuckled state.
- [c2] The device of claim 1 wherein the energy harvesting element comprises a piezoelectric material.
- [c3] The device of claim 1 wherein the energy harvesting element comprises an antenna capturing stray radiant radio frequency energy.
- [c4] The device of claim 1 wherein the signal comprises a seatbelt location identifier.
- [c5] The device of claim 1 wherein the self-powered wireless switch assembly is coupled to a buckle side of said seatbelt.

[c6] The device of claim 1 wherein the self-powered wireless switch assembly is coupled to a tongue side of said seat-belt buckle.

[c7] The device of claim 1 further comprising a receiver receiving the wireless signal and generates an electrical status signal corresponding to the wireless signal.

[c8] An automotive vehicle comprising:
a seat;
a seatbelt mounted adjacent to said seat;
a device comprising said seatbelt having a buckled state and an unbuckled state, a self-powered wireless switch assembly coupled to the seatbelt, the self-powered wireless switch assembly comprising an energy harvesting element generating electrical power, and a wireless transmitter transmitting a wireless signal corresponding to the buckled state and the unbuckled state;
a receiver receiving the wireless signal and generating an electrical status signal corresponding to the wireless signal; and
an indicator coupled to the receiver to display the electrical status signal.

[c9] The automotive vehicle of claim 8 wherein the energy harvesting element includes a piezoelectric device.

- [c10] The automotive vehicle of claim 8 wherein the seat is removable.
- [c11] The automotive vehicle of claim 8 wherein the seat is non-removable.
- [c12] The automotive vehicle of claim 8 wherein the seat is foldable.
- [c13] The automotive vehicle of claim 8 further comprising a plurality of receivers.
- [c14] The automotive vehicle of claim 8 wherein the receiver communicates wirelessly with the indicator.
- [c15] The automotive vehicle of claim 8 further comprising a control module for conditioning the electrical status signal received from the receiver and the conditioned electrical status signal to the indicator.
- [c16] A method of using a device in an automotive vehicle comprising:
 - coupling a seatbelt comprising a tongue side to a buckle side;
 - generating power from an energy harvesting element in response to coupling;
 - generating a seatbelt status in response to the coupling;
 - powering a transmitter with the power;

transmitting a wireless signal comprising the seatbelt status;
receiving the wireless signal in a receiver; and
generating an alert message indicative of the seatbelt status.

[c17] The method of claim 16 wherein transmitting the wireless signal comprises a seatbelt identification and a seatbelt status.

[c18] The method of claim 16 wherein the energy harvesting element is a piezoelectric material.

[c19] The method of claim 17 wherein transmitting the wireless signal comprises a second seatbelt identification and a second seatbelt status.

[c20] The method of claim 17 wherein transmitting the wireless signal comprises a plurality of seatbelt identifications and a plurality of seatbelt statuses.

[c21] A device for an automotive vehicle comprising:
a seatbelt having a buckled state and an unbuckled state;
a self-powered wireless switch assembly coupled to the seatbelt, the self-powered wireless switch assembly comprising an energy harvesting element generating electrical power and a transmitter transmitting a electri-

cal status signal corresponding to the buckled state and the unbuckled state; and
an indicator coupled to the self-powered wireless switch assembly, the indicator receiving the electrical status signal and generating an indication corresponding to the electrical status signal.

[c22] The device of claim 21 wherein the self-powered wireless switch assembly further comprises a wireless transmitter transmitting a wireless status signal corresponding to the buckled state and the unbuckled state.